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THE
JOURNAL OF GEOLOGY

JULY-AUGUST, 1913

THE SIGNIFICANCE OF RECENT DEVELOPMENTS IN
THE PRE-CAMBRIAN STRATIGRAPHY OF THE
LAKE SUPERIOR-LAKE HURON REGION

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INTRODUCTION

The geological investigations carried on during the last decade in the northern parts of the Canadian provinces of Ontario and Quebec have added much to our knowledge of the pre-Cambrian terranes of that region, notably so in the Lake Timiskaming district, where the discovery of the silver-bearing veins at Cobalt and of the auriferous quartz lodes at Porcupine has led to extended exploration in the adjoining country. And it is now generally accepted that the pre-Cambrian rocks of northwestern Quebec and northeastern Ontario fall naturally into two strikingly different divisions, separated by a most profound (pre-Huronian) erosion interval. It is also possible, as will be shown in the following pages, that the ancient peneplain or paleoplain formed during this interval, was continuous with the pre-Animikie or Eparchaeon¹ erosion plane which occurs in the region north and west of Lake Superior, and that the so-called Lower or Lower-Middle Huronian sediments found in the same locality are in reality a part of the basement complex and pre-Huronian in age.

¹ A. C. Lawson, *Bull. Univ. of Cal.*, III, 50-62.

PRINCIPLES OF PRE-CAMBRIAN CORRELATION

Since pre-Cambrian rocks are generally unfossiliferous, their correlation must be based on either their lithological similarity, their similar stratigraphical relations or their similarity of structure. The criteria of pre-Cambrian correlation may thus be enumerated as follows: (1) stratigraphical relations; (2) lithological character; (3) degree of folding and metamorphism; (4) relationship to igneous intrusions. These will accordingly be used as the basis of the correlations suggested in the following pages.

LAKE HURON-LAKE TIMISKAMING-LAKE MISTASSINI REGION

The earliest stratigraphical investigation of the pre-Cambrian rocks occurring in the Lake Superior-Lake Huron region was that of Logan and Murray on the north shore of Lake Huron, where they found a great series of slightly folded sediments resting unconformably on a basement complex consisting chiefly of granite and gneiss. To the rocks of the first group the name Huronian was given, while the granite and gneiss were correlated with the similar Laurentian granite and gneiss occurring in the vicinity of the Ottawa farther to the eastward. From this classification it is apparent that, theoretically at least, Logan recognized the divisibility of the pre-Cambrian into a Huronian system and an older complex, although both he and his successors in the later reconnaissance work carried on in other districts included greenstones, green schists, and other rocks in the Huronian which are now known to belong to the basement complex.

It was not until about ten years ago, when detailed geological work was begun in the Timiskaming region, that it was found that in this district as on the north shore of Lake Huron a series of slightly disturbed sediments rested in striking erosional and structural unconformity on a basement complex.¹ This complex contained a large proportion of volcanic rocks which were then called Keewatin on the assumption that they were the equivalent of similar rocks occurring in the Lake of the Woods region 500 miles to the westward.² In this way it became customary to divide the older complex of the Timiskaming region into two divisions, (1) the

¹ A. E. Barlow, *Ann. Rep. G.S.C.*, XV, 127a, 1903.

² W. G. Miller, *Ann. Rep., Ont. Bur. of Mines*, Pt. II, 1905.

Keewatin, which included the surface rocks, composed largely of volcanic flows, and (2) the Laurentian, consisting largely of plutonic granite and gneiss. During the last few years, however, has it been found that the so-called Keewatin complex includes a much larger proportion of sedimentary rocks—conglomerate, arkose, greywacke, slate, etc.—than was formerly supposed, and to these various local names—Pontiac schist,¹ Fabre Series,² Timiskaming Series,³ Sudbury Series, etc.—have been given. These rocks have been found in almost every area where detailed geological work has been carried on. They occur in the Sudbury district, in the vicinity of Lake Timagami, in the Larder Lake district, in the Cobalt region, in the Porcupine district and in numerous localities in northwestern Quebec. In the last-mentioned region a belt of fine-grained, rusty mica schist, which contains squeezed pebbles of granite and greenstone, has been traced continuously for 100 miles by J. A. Bancroft and the writer. Throughout all this distance the schist is intruded by dikes of granite, aplite, and pegmatite, showing conclusively that it is older than at least part of the Laurentian gneissic complex. In defining the various series to which these rocks have been referred, it has been assumed in most cases, (1) that they belong to the Huronian, and (2) that they are younger than all the volcanics of the basement complex.

Both of these assumptions are probably unwarranted. In objection to the use of the name Huronian for the sediments occurring in the volcanic complex, it might be pointed out that they occur throughout an area of many thousand square miles, and everywhere possess characteristics which are distinctly at variance with those of the typical Huronian. They form a part of a basement complex which, as shall be shown later, probably lies stratigraphically below the original Huronian. Lithologically they have little in common with the original Huronian, and unlike the Huronian, they are everywhere highly folded, foliated, and intruded by granite batholiths. The second of these assumptions implies that the sedimentary rocks are stratigraphically as well as lithologically separate from the volcanics, a conclusion which is con-

¹ M. E. Wilson, *Sum. Rep. Geo. Surv. Dept. of Mines, Can.*, p. 175, 1909.

² R. Harvie, *Geology of a Portion of Fabre Township* (Dept. of Mines, Que.), 1911.

³ W. G. Miller, *Eng. and Min. Jour.*, XCII, p. 648, 1911.

trary to the facts, for, while the presence of a heterogeneous assortment of pebbles in the conglomerate indicates that a great erosion interval is probably represented, there is evidence, in some localities, that the sediments and volcanic flows are interbedded and consequently, if two series are present, it is evident that volcanic flows occur in both. In many localities either because of the highly deformed condition of the rocks, or because of the paucity of exposures, or because of the lithological similarity of the volcanic flows, it is not possible to separate these various rocks into stratigraphical divisions. For these reasons it seems necessary at present to class them together into one group regardless of possible differences in age, making merely such subdivisions as are convenient for the purpose of lithological description. In accordance with the foregoing conclusion the writer has adopted the term Abitibi group to include all the surface rocks, i.e., the sediments and volcanic flows, of the older complex occurring in the Timiskaming region. Since the surface rocks are placed in the Abitibi group, the plutonic granite and gneiss must naturally be referred to the Laurentian. But it is important to note that the Laurentian according to this definition, most probably includes granitic rocks of at least two periods of intrusion, as shown by the presence of granite pebbles in conglomerate which is itself intruded by granite.

The flat-lying sediments which rest on the base-leveled surface of the basement complex in the Timiskaming region, when first recognized as distinct from the underlying volcanics, were called Lower and Middle Huronian,¹ but as there was some doubt as to which particular division of the Huronian they should really be referred, they are now generally known as the Cobalt series.² They outcrop throughout a region extending from the Abitibi district in Quebec to the Sudbury district in Ontario, and occupy an area of not less than twenty thousand square miles. Throughout all this area they rest on a remarkably uniform erosion surface, which might be described as a fossil peneplain.

In the Chibougamau district near Lake Mistassini, 200 miles to the northeast of the Timiskaming region, there is a series of slightly disturbed sediments which resembles the Cobalt series

¹ *Ann. Rep., Ont. Bur. of Mines*, Pt. II, 1905.

² W. G. Miller. *Eng. and Min. Jour.*, XCIII, 643, 1911.

both in its lithological character and in the stratigraphical succession of its members, and like the Cobalt series rests on the trunkated surface of a basement complex.¹ Throughout the intervening distance between Lake Timiskaming and Lake Chibougamau, no outcrops of the Cobalt series have been described, but the Abitibi group and the Laurentian are typically developed throughout the whole interval. From these facts it may be concluded that the pre-Cobalt series erosion plane, the Abitibi group and the Laurentian extend eastward to the Chibougamau district.

From the evidence already cited it might be inferred that the pre-Cobalt series erosion plane is also the equivalent of that which underlies the original Huronian rocks on the north shore of Lake Huron, but since a large part of the conclusions of this paper are based on the correlation of these two planes, it is important that the evidence be stated in full. In support of their correlation it might first be pointed out that the Cobalt series and the two original Huronian series are structurally and lithologically very similar, even to the presence of a sea-green quartzite containing pebbles of jasper and quartz. It is true that until recently, it was thought that the limestone was absent in the Cobalt series, but as that series is traced southward it changes somewhat in character, and limestone beds have been found to be present in the district north-east of Sudbury.² Not only are the original Huronian rocks similar to the Cobalt series, but there is no other series in the Timiskaming region which resembles them either in lithological character, structure, or relationship to batholithic intrusions. The basement complex which underlies the original Huronian rocks has not been studied in detail, but like that beneath the Cobalt series, it consists in the main of metamorphosed volcanic flows intruded by granite and gneiss. Thus in both districts an older complex occurs which is separated from the overlying slightly disturbed sediments by erosion planes, which would coalesce if projected across the interval which intervenes between the known occurrences of the Cobalt series and the original Huronian.

From the foregoing discussion it follows that throughout the

¹ *Rep. on the Geol. of the Chibougamau Region* (Dept. of Mines, Que.), pp. 134-38, 1911.

² W. H. Collins, *Sum. Rep. Geo. Surv. Dept. of Mines, Can.*, 1913.

Lake Huron-Lake Timiskaming-Lake Mistassini region, pre-Cambrian sedimentary rocks occur here and there, which were laid down upon the surface of a basement complex. This of course does not make it necessary that the original Huronian rocks, the Cobalt series and the rocks described as Huronian in the Chibougamau district, are wholly contemporaneous. In fact this is scarcely probable since there are two series present¹ in the original Huronian group of rocks and, as far as known, only one elsewhere. Nevertheless it is evident that all of these younger sediments were derived from similar sources, that they originated under somewhat similar conditions, that their history since their deposition has been similar, and that the floor upon which they were deposited was the same.

THE LAKE SUPERIOR REGION

Having shown that an early pre-Cambrian paleoplain extends throughout such a wide area of country in northwestern Quebec and northeastern Ontario, two questions now present themselves: (1) does this pre-Huronian erosion plane extend throughout the Lake Superior region, and (2) what rocks in that area correspond to the basement complex of the Lake Huron-Lake Timiskaming-Lake Mistassini region?

From the geological reports which have been published with regard to various districts in northern Ontario and the adjacent portions of United States to the west of Lake Superior, it is known that throughout the wide area of country which extends from the Timiskaming region to the Vermilion district in Minnesota, there is a basal (pre-Animikie) complex composed in part of volcanic rocks and in part of granite and gneiss, and in almost every locality where detailed work has been carried on—on the east shore of Lake Superior near Batchawana bay,² in the Michipacoten district,³ near Heron bay on the northeast shore of Lake Superior,⁴ in the Nipigon district,⁵ in the vicinity of Port Arthur,⁶ in the region

¹ According to C. R. Van Hise, *Bull. Geo. Soc. Am.*, p. 5, 1908.

² *Ann. Rep. Ont. Bur. of Mines*, p. 127, 1892.

³ *Ibid.*, pp. 152-85, 1902.

⁴ *Ibid.*, p. 127, 1892.

⁵ *Ibid.*, 1908, 1909; *National Transcontinental Railway between Lake Nipigon and Sturgeon Lake* (Geol. Surv. Dept. of Mines, Can.), 1908; *Geology of the Nipigon Basin*, Memoir No. 1 (Geol. Surv. Dept. of Mines, Can.), 1910.

⁶ *Ann. Rep. Ont. Bur. of Mines*. DD. 254-60, 1905.

between Lake Savant and Lost Lake,¹ in the Lake of the Woods and Rainy Lake districts,² in the Vermilion district,³ and at Steep Rock Lake,⁴ it has been found that highly metamorphosed conglomerates, slates and schists of sedimentary origin occur in association with the volcanics and, as in the pre-Cobalt series complex of the Timiskaming region, the conglomerate although intruded by granite contains granite pebbles. But in only two localities—the Vermilion district and Steep Rock Lake—has the conglomerate been found resting unconformably on the surface of the older granite from which its pebbles were derived.

Here and there this basement complex is overlain by two series of almost flat-lying sediments, the older of which is known as Animikie and the younger as Keweenawan. In some places, as on the shore of Thunder Bay, both series are present; but in others the Animikie occurs alone, or the Animikie is absent and the Keweenawan rests directly on the surface of the complex.

The names which have been applied to the various formations composing the (pre-Animikie) complex found in the region north and west of Lake Superior, have varied in different localities and at different times. For many years following the work of Logan and Murray on the north shore of Lake Huron, the geologists who investigated these pre-Cambrian terranes, with but one notable exception, called the granite and gneiss Laurentian and the volcanic complex Huronian. But A. C. Lawson who reported on the geology of the Lake of the Woods and Rainy Lake regions for the Canadian Geological Survey, departed from the general custom and adopted a local nomenclature. According to Lawson's classification the granite and gneiss were Laurentian, but the volcanics and sediments were grouped into an Ontarian system which had two divisions, the Coutchiching series, largely composed of sedimentary mica schist and the Keewatin, consisting for the most part of volcanics. In the Vermilion district of Minnesota, where much detailed geological work has been carried on since Lawson's reports

¹ *National Transcontinental Railway between Lake Nipigon and Clay Lake* (Geol. Surv. Dept. of Mines, Can.), 1909; *Ann. Rep. Ont. Bur. of Mines*, 1910.

² *Ann. Rep. G.S.C.*, I, Part CC, 1885; *ibid.*, III, Part F, 1887-88.

³ *U.S.G.S. Mon.*, XLV, 1903; *ibid.*, Vol. LII, 1911.

⁴ *Memoir No. 28* (G.S. Dept. of Mines, Can.), 1912.

were published, the volcanic rocks of the complex have been classed as Keewatin in accordance with Lawson's nomenclature, but the name Laurentian has been limited to the older granite which lies unconformably beneath the Ogiskie conglomerate and Knife Lake slates, while these sediments, along with the younger granite which intrudes them, have been designated Lower or Lower-Middle Huronian. The scheme of classification worked out in the Vermilion region is essentially the same as that indorsed by the International Committee in their report on the pre-Cambrian nomenclature of the Lake Superior region¹ and has been generally adopted, as far as practicable, by Canadian geologists engaged in geological work in the pre-Cambrian regions of northern Ontario and Quebec.

But in applying this classification in the Lake Huron-Lake Timiskaming region, serious difficulties have been encountered, for the rocks known as Lower-Middle Huronian in the region north of Lake Superior are similar in every respect to the younger (Timiskaming, etc.) series occurring in the pre-Cobalt series complex, whereas the name Lower-Middle Huronian implies that they are approximately equivalent in age to the Cobalt series and the original Huronian, which they resemble in no particular whatever. While it might be objected that the Lower-Middle Huronian rocks of the region north of Lake Superior are too far distant from the rocks composing the Timiskaming series for their correlation, yet, if the rocks occurring in these two regions are to be correlated at all, then the Lower-Middle Huronian must certainly be correlated with the pre-Huronian Timiskaming series, rather than with the Cobalt series or the original Huronian. At any rate, it is at least probable, from the remarkable lithological and structural similarity of the basal pre-Cambrian rocks occurring throughout the whole region from Lake Superior to Lake Timiskaming, and the evidence of the presence of an erosion interval in the pre-Cobalt series complex, similar to that beneath the Ogiskie conglomerate in the Vermilion region, that the rocks which underlie the Cobalt series in the Timiskaming region are the same as those beneath the Animikie series in the region north and west of Lake Superior and that the pre-Huronian paleoplain occurring in the Lake Huron-Lake

¹ *Jour. of Geol.*, XIII, 89-104, 1905.

Timiskaming region was originally continuous with the pre-Animikie or Eparchaeon erosion plane. It also follows from this conclusion that the name Lower or Lower-Middle Huronian for any series of rocks in the basement complex occurring to the north and west of Lake Superior is inapplicable; nor does the limitation of the name Laurentian to the older granite in the Vermilion region seem advisable, for this usage is not only contrary to the original definition of the term, but also contrary to the requirements of our nomenclature, since in many localities it is impossible to state whether a particular granite or gneiss belongs to the younger or older of the granitic rocks recognized to be present in the pre-Cambrian basal complex.

The conclusion that the rocks classed as Lower or Lower-Middle Huronian in the region north of Lake Superior are probably pre-Huronian in age was reached from two premises: (1) that the same series of rocks is present in the complex which underlies the Cobalt series, and (2) that the pre-Cobalt series complex also underlies the original Huronian rocks on the north shore of Lake Huron. By making a direct comparison of the Lower-Middle Huronian rocks occurring to the north of Lake Superior with those occurring to the south of the lake, this correlation may be tested in another way. In the region south of Lake Superior, as in the other pre-Cambrian areas, there is a basement complex composed of greenstone and green schist intruded by batholiths of granite and gneiss, but in that locality the complex is overlain by a succession of four rock series. These, named in ascending order, are known as Lower Huronian, Middle Huronian, Upper Huronian, and Keweenawan respectively. The Lower and Middle Huronian are believed to be the equivalent of the original Huronian on the north shore of Lake Huron, while the Upper Huronian is correlated with the Animikie series of the north shore of Lake Superior. The Keweenawan series, as the name implies, is also believed to correspond to the series of the same name on the north shore of Lake Superior. These correlations have been generally accepted¹ and are almost wholly in accord with the criteria of pre-Cambrian correlation, so that for the purpose of this discussion they may be taken as repre-

¹ R. D. Irving, *Am. Jour. Sci.*, XXXIV, 204, 1887.

senting the facts. And since there is a series of rocks in the older complex north of Lake Superior classed as Lower-Middle Huronian, it has evidently been assumed that it is the equivalent of the Lower and Middle Huronian occurring to the south of Lake Superior. Accordingly, by comparing the Huronians of the two regions, we can ascertain on what facts their correlation has been based.

1. The Huronian rocks of the southern area are largely quartzites, limestones, dolomites, and slates, while those of the northern area consist for the most part of conglomerate slate and mica schist. Their correlation has therefore not been based on the similarity of their lithological character.

2. The Huronian of the north is intruded by batholiths of granite and gneiss; that of the south is not so intruded. It is also evident therefore that their correlation cannot be attributed to any similarity in their relationships to igneous intrusions.

3. The northern Huronian has not only been more highly folded and deformed than the southern, but the deformation occurred at a much earlier period in the north than in the south, for the Animikie rocks of the north are not only almost flat-lying, but they rest on a peneplained surface, so that the deformation in the underlying complex was complete long before the Animikie sediments were laid down. To the south of Lake Superior, on the other hand, the Animikie and Keweenawan rocks are highly folded, and hence, if the Animikie and Keweenawan deformation were eliminated throughout the whole Lake Superior region, the southern Huronian would be but slightly disturbed, whereas that of the north would be just as much folded and deformed as at present. It is again apparent therefore, that the northern Lower-Middle Huronian has not been correlated with that of the south, on the grounds that both have been folded and deformed to the same degree or at the same time.

4. The Huronian to the south of Lake Superior like that to the north, rests unconformably on the surface of a complex composed of greenstone, greenschist and iron formation (Keewatin) intruded by granite and gneiss, so that the stratigraphical relations of the Huronians in both localities are apparently the same; and it was evidently upon this fact that their correlation was based, but in

considering the stratigraphical relations of greater importance than all the other criteria combined, the geologists who made the correlation ignored the possibility of overlap.

The geological investigations carried on throughout the region north of Lake Superior have shown that the rocks classed as Lower-Middle Huronian occur here and there throughout the basal complex as truncated synclinal remnants, and that relatively their areal extent is exceedingly small; and since the total area of the rocks which have been differentiated as Keewatin in the region south of Lake Superior is only 60 square miles in extent,¹ it is possible that the stratigraphical relations observed are due to the fact that one of these synclinal remnants does not happen to occur in this limited area. If this were the case, then the pre-Huronian complex to the south of Lake Superior and the pre-Animikie complex to the north of the lake would be equivalent, although the stratigraphical relations of the Huronian to the south and Huronian to the north would be apparently the same. Consequently, although the stratigraphical relations of the so-called Lower-Middle Huronian of the Vermilion district are apparently similar to those of the Lower and Middle Huronian to the south of Lake Superior, yet from the consideration of the other facts—that the two groups of rocks are lithologically unlike, that those of the north are intruded by batholiths of granite and gneiss while those of the south are not so intruded, and that the deformation and folding in the south occurred long after that in the north—it must be concluded that the evidence in favor of their correlation is not sufficiently conclusive to preclude the possibility of an alternative hypothesis.

CONCLUSION

The evidence and the conclusions inferred from the evidence as stated in the preceding pages, may be summarized briefly as follows: (1) The paleoplains which underlie the original Huronian rocks on the north shore of Lake Huron and the Cobalt series in the Timiskaming region were originally continuous. (2) The complex which underlies the Cobalt series in the Timiskaming region and that which underlies the Animikie series in the region

¹ *U.S.G.S. Mon.*, Vol. LII, Plate I, 1912.

north of Lake Superior are the same. (3) From (1) and (2) it is inferred that the pre-Huronian erosion plane was also originally continuous with the pre-Animikie or Eparchaeon erosion plane, and that the rocks classed as Lower-Middle Huronian in the region north of Lake Superior are therefore a part of the basement complex and in reality pre-Huronian in age. (4) If the rocks classed as Lower and Middle Huronian in the region south of Lake Superior have been correctly correlated with the original Huronian, then these series must also be younger than the Lower-Middle Huronian of the region north of Lake Superior; (5) A direct comparison of the Lower-Middle Huronian of the region north of Lake Superior with the Lower and Middle Huronian occurring to the south of Lake Superior shows that the correlation of these series is based on evidence from which an alternative inference conforming to the conclusion cited in (3) may be drawn.

With the progress of geological investigation in the pre-Cambrian terranes of the Canadian oldland, new facts are constantly being added to our knowledge of their stratigraphy, and from the evidence now available it can be reasonably inferred that the pre-Cambrian rocks throughout the whole of the Lake Superior region and eastward through northern Ontario and western Quebec, fall naturally into two great divisions, an older complex and a group of younger rocks, which differ from the complex in that they generally contain a much larger proportion of sediments, are generally much less highly folded and metamorphosed, and as far as geological investigation has shown, are nowhere intruded by batholiths of granite or gneiss. This younger group of rocks includes (1) the Cobalt series in the Timiskaming region, (2) the Animikie and Keweenawan series in the region north of Lake Superior, (3) the original Huronian series on the north shore of Lake Huron, and (4) the rocks known as Lower Huronian, Middle Huronian, Upper Huronian and Keweenawan in the region south of Lake Superior. This conception of the stratigraphical relationships of these various younger pre-Cambrian series involves no unusual phenomena, for just as in later geological periods Cretaceous, Silurian, and other sediments of different ages were deposited on the surface of the same basal complex, so in Huronian

time, the Animikie series might be laid down on the same erosion surface on the north shore of Lake Superior, as the Huronian on the south. If the Lower and Middle Huronian series are not present in the region north of Lake Superior, it must simply be inferred that they were never deposited in that region, or, if deposited, they were eroded away before the Animikie sediments were laid down, and that the geological time represented by the Eparchaeon interval in the region north of Lake Superior is represented in the region south of the lake, by three erosion intervals and two series of sediments.

The rocks comprising the basement complex which everywhere underlies the younger pre-Cambrian series, have suffered so many vicissitudes that although there is evidence, in many localities, that two series of surface rocks and granitic batholiths of two periods of intrusion are present, yet it is not possible in many places to separate the rocks stratigraphically from one another. For this reason the only *regional* classification practicable *at present*, is to divide the complex into two divisions according as to whether they belong to the plutonic or surface types. For the plutonic rocks the name Laurentian has been generally used, and while this name, according to the original conception of Logan, might be more properly referred to the whole basement complex, it has since been referred to the plutonic types so constantly, both by Logan and by his successors, that it seems best to use it with that significance. For the surface rocks of the complex, the writer has used the name Abitibi group in the Timiskaming region, but this probably corresponds to the Ontario system into which Lawson grouped the Keewatin and Couchiching series occurring in the Lake of the Woods and Rainy Lake regions. The subdivisions of the basement complex (Archaeon) according to this classification would thus be as follows:

HURONIAN

PRE-HURONIAN PALEOPLAIN

| | | | | |
|---------------------|---|------------------------------|---|--|
| Basement Complex | { | Laurentian | { | Younger Laurentian granite and gneiss. |
| | | | { | Older Laurentian granite and gneiss. |
| | { | Ontarian or Abitibi group | { | Composed of at least two series, to be given local names where subdivision is possible. |

The regional correlation of pre-Cambrian rocks from the nature of the evidence upon which it is based must always be to a degree hypothetical, but so long as it is logically inferred from a reasonable number of facts and its hypothetical character is kept in mind by geologists, it serves a useful purpose in the progress of our science. In the report of the Special Committee on the Lake Superior region, certain sedimentary rocks included in the basement complex to the north of Lake Superior were called Huronian, and thus tacitly correlated with the Huronian rocks occurring in the region south of Lake Superior and on the north shore of Lake Huron. The purpose of the present paper has been to point out that from a careful consideration of the facts now at hand, it must be concluded that the evidence on the whole is equally in favor of an alternative hypothesis, that these ancient sediments are a part of the older complex which underlies the Huronian, and are pre-Huronian in age.